

# Virtual Cart: Novel Approach for Revamping Smart Shopping Experience

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**Abstract**—This paper proposes smartphone application named Virtual Cart for facilitating an easy and convenient method for purchasing in shopping malls. Nowadays, due to the lifestyle and demands, majority of human beings are becoming increasingly occupied, need of the hour is to get all personal works done easily with minimum effort and time-consumption.

Shopping at malls is a frequently carried out activity in . There can be a big rush at malls on holidays, weekends especially during special offers and discounts. Contrast to shopping in malls, people prefer online shopping to get required items through Amazon, Flipkart and Snapdeal etc., where they cannot have the look and feel of items unless they receive the delivery. So, to solve this problem we have proposed Virtual Cart, using which, one can overcome the complications of online and offline shopping by ensuring a better shopping experience.

**Keywords:** online shopping, offline shopping, android application,

## I. INTRODUCTION

Since the beginning of the Internet, sellers have sought to trade their goods to publics who surf the World Wide Web. Buyers can browse through online sites ubiquitously and can place order. Customers buy a range of products from online websites. Because of the convenience offered by online shopping, majority of customers prefer to shop online.

On the similar lines, Virtual Cart allows people to shop through ceaseless options by combining the facilities provided by both online and offline shopping. If customer is looking for artifact that may not be available in the vicinity, if the same user is sure about what he/she is looking for on the Internet, user can compare material quality, sizes and pricing and complete the purchase through multiple online vendors at the same time.

The hybrid application Virtual Cart can even extend friendly customer service for 24 hours a day with respect to locating, purchasing and shipping customer needs<sup>1</sup>.

### A. Traditional Versus Online Shopping

Traditional shopping is a tedious and time-consuming job. Although the growing trend of online shopping has reduced

some load, but, experientially following factors discourage users from shopping online.

- There is still some difference in actually going to shops and hand picking products to get the feel of their quality and features that cannot be experienced online.
- Customers feel wary to carry out online purchases due to fear of less secure transaction process that may lead to hacking of users sensitive data, insecurity of credit/debit cards, unreliability or breach of privacy.

In contract to online shopping, offline shopping is convenient, but it poses intricate challenges and becomes troublesome to deal with following factors,

- In traditional shopping, the customer has to wait in long queues at cash counter especially during checkout process irrespective of the number of items they are checking out of the shop.
- Waiting becomes more when the people in front of you are counting their cash or coupons at unbelievably slow pace, cancelling their product from the cart while billing and also during discount sales. The billing process at the shop is the most tedious part of shopping and we believe this can be eliminated.
- When customer is in the large store for the first time, finding a specific product can be a time consuming and difficult task.
- Retail stores make use of barcodes to identify each and every product. In terms of data storage, barcodes consume less data mostly numeric and take up greater space as they are one dimensional. If a barcode is damaged or dirty they are not capable of reading any data and they cannot be properly scanned.

We believe that this entire system (shopping experience using online and offline platforms) can be changed to provide a better shopping experience for the customers by allowing them to shop using just the smartphones through digital solutions. Virtual cart aims at removing flaws of both kinds of shopping and bridge the gap between physical and virtual world. The

merits and demerits of existing system and its challenges is illustrated in fig. 1. The working of virtual cart is given in 2.

## II. LITERATURE SURVEY

During the phase of literature review we realized that majority of the individuals select to walk out of the mall tired of standing in big queues to purchase a small number of items. Addition to this, customers find it tough to find the item to buy, after picking item they should wait in the long queue for making payment. For solve this problem, there are several technological solutions implemented in hypermarket help. All such solutions share the same aims: Save customers money and time, help the venders to win trustworthy customers. The wholesale industry has been encouraging Smart Shopping for many years by adopting various tools [1] to improve the shopping experience in the trade atmosphere.

The idea of smart shopping assurances to offer on the spot data about numerous concessions, schemes, etc. whenever is needed. While coming across various technologies such as online shopping, where items are purchased online through various websites, the drawbacks [2] encountered were-

- Fraud
- Shipping cost
- Deprives our tangibility
- Lack of options

In traditional shopping method various difficulties [3] faced are

- Long Queues
- Huge waiting time
- Pushing the heavy trolley

Survey was conducted at three places-

- Reliance Fresh
- More Supermarket
- Big Bazar

Issues-

- Long Queues
- Barcode scanning for each item
- Payment issues on regular basis

This project assumes that the application described would be a prototype that would shape the future and there still remains much to do in terms of development and improvement of existing models. Applications created with ease of understanding and the design can be created and tailored to the shopping process to make it more effective and user friendly, thus making it easier and convenient for the users to do the entire shopping process with the use of this application.

## III. PROPOSED WORK

We propose a system that has a mobile application which can be downloaded onto any smartphone to completely digitalizes the shopping process (flow of events in proposed method is shown in fig. 2).

In the proposed system we are using multiplexing and demultiplex algorithm for recognizing and fetching the data stored in the cloud to provide various services that can

recognize the authenticity of any product. This smartphone application is one that provides a user interface (UI) to interact with the products, by means of adding, viewing, removing it to a personalized cart.

Firstly, our application provides the fastest route to the users destination mall from the current location. It is also provided with a budget planner before the customer starts purchasing, he can set the budget and we can also change the budget at any instant if the budget exceeds.

Customers can also know the ongoing offers and discounts by scanning the QR code [4]. The application also provides the ingredients of particular recipes. The application is also able to tell the users which section of the store, a particular product can be found in. This enables the users to quickly find what he or she is looking for. The UI display updates with the current products details and user can select his/her item of purchase and immediately the total bill auto-increments.

After the shopping is done, the order is confirmed through an OTP and the final bill is generated and this approach bypasses that a hassle of standing in long queue to get their items checked out, later the payment can be done on customers convenience. Complete logic behind the working of Virtual Cart is illustrated as flowchart in fig. 3.

## IV. IMPLEMENTATION DETAILS

We have developed Virtual Cart initially for Android platform. Android is an operating system developed for smartphones and tablets. It is based on Linux kernel and uses Dalvik Virtual Machine (DVM) for executing Java bytecode [5]. The absence of GNU C Library and some functions differentiate it from being Pure Linux. Some features of Android are-

- Highly customizable nature and Reasonable Price.
- High degree of ease due to presence of PC like applications.
- Hardware and Software features.
- Full control over OS.

Android software environment consists of-

- Linux kernel.
- Libraries and Dalvik Virtual Machine.
- Application Framework.
- Applications (built-in and custom).

For facilitating the communication between Virtual Cart smart application and database stored in cloud, we have used web services. Basically, web service is a program which can bond to any server that is connected and running in the Internet to and launch communication between two or multiple devices. It uses Hyper Text Transfer Protocol as common protocol communication. Web service is required to begin interaction between Android device and Shop's cloud for sending and receiving the data.

Smart Shopping application uses Representational State Transfer protocol (REST) [6], an architectural style, as a web service for the Virtual Cart. REST has a set of guidelines for creating web services. REST has following architectural properties-

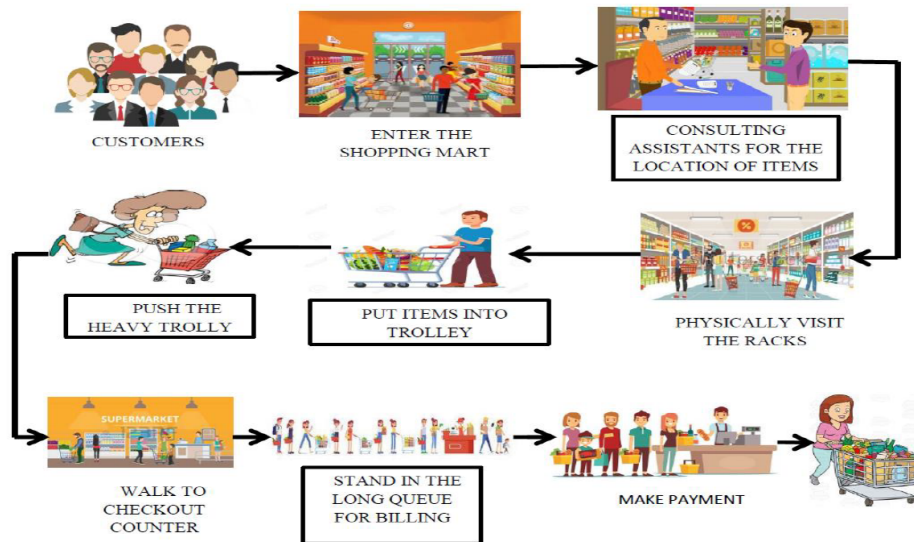


Fig. 1: Existing System: All the time consuming steps in offline shopping is marked with box in the figure (i.e., consulting assistant, pushing the trolley, finding the required item, standing in the billing queue for making payment.)

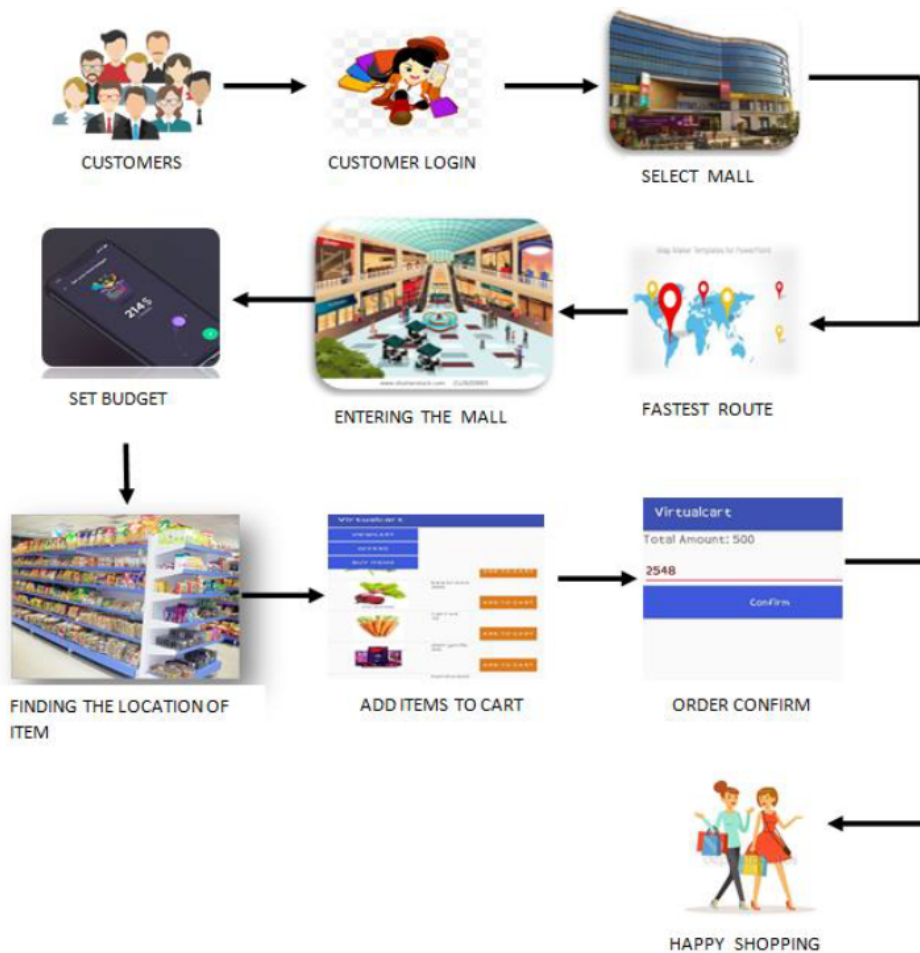


Fig. 2: Proposed method using Virtual Cart: Hurdles of existing system removed by smartphone application.

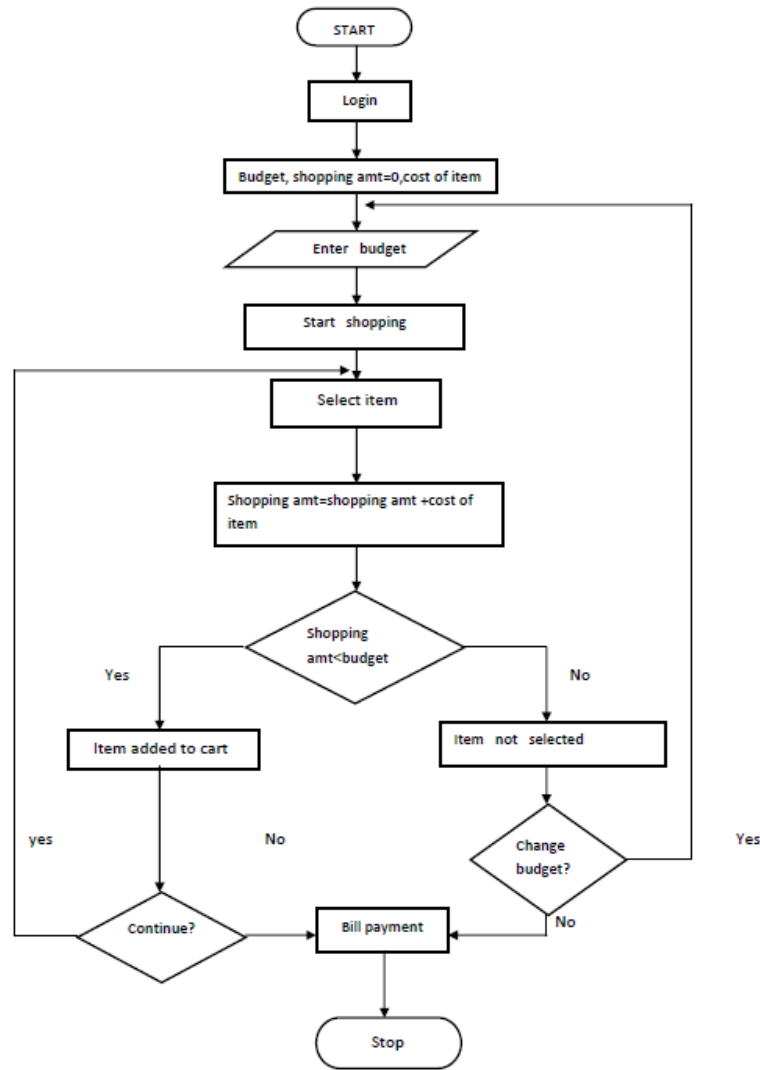


Fig. 3: Sequence of events and conditions in Virtual Cart application.

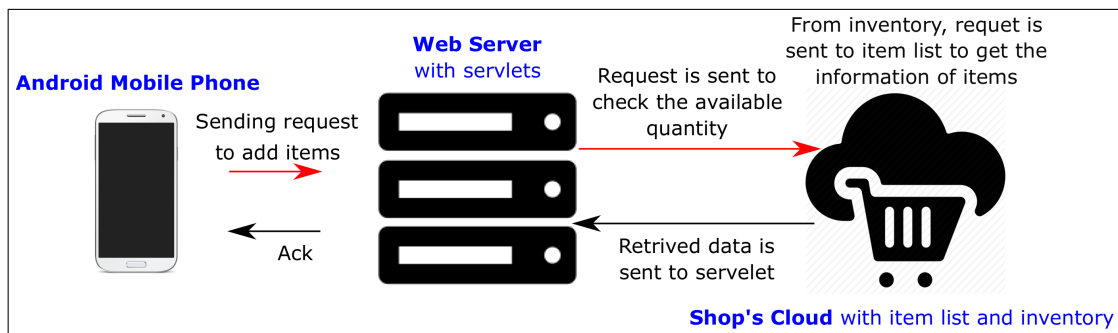


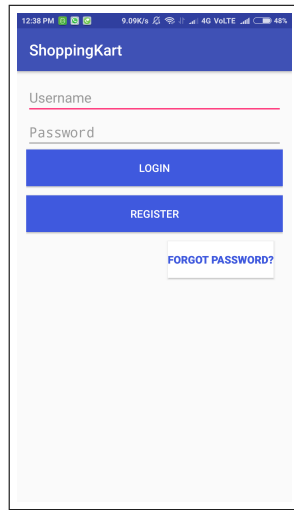
Fig. 4: Framework of virtual cart: an novel approach for revamping smart shopping experience

- Client-server
- Stateless
- Manipulation of the resources
- Self-descriptive messages

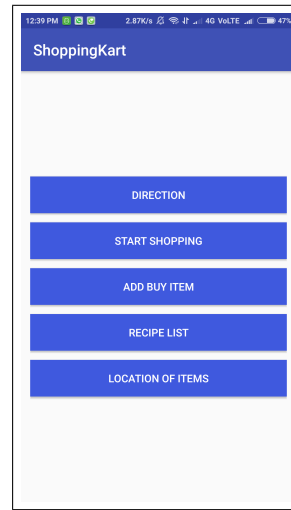
- Resource identification.

#### A. Technologies used

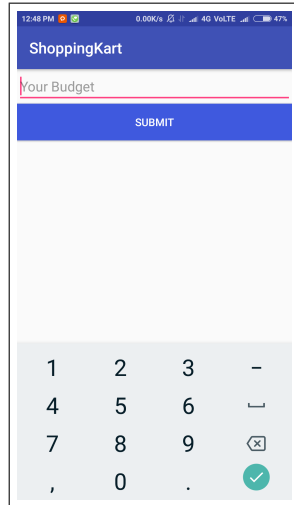
- Android Studio [7].



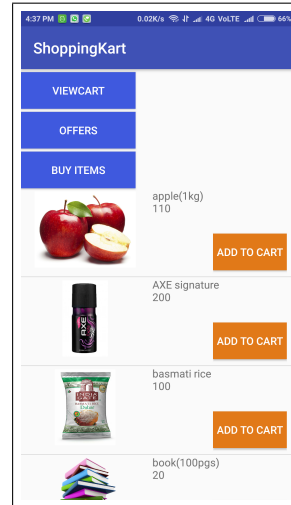
(a) Initial login page for accessing contents.



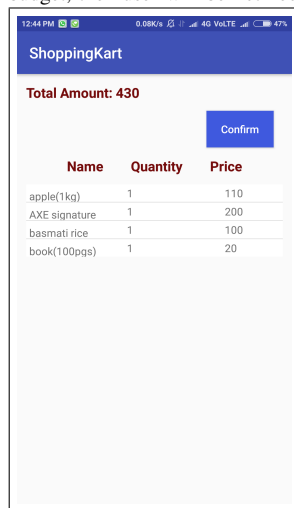
(b) Various functions offered by Virtual Cart



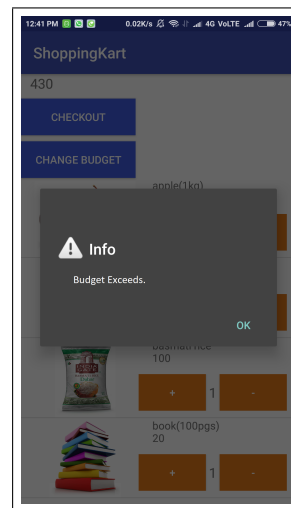
(c) User can set the budget of purchase, if purchase cost exceeds budget, then user will be notified.



(d) Activity displaying the items in the cart.



(e) Confirmation screen to check-out the purchase.



(f) Notifying the user if the purchase cost > the actual budget of shopping.

Fig. 5: Concept drift localization around trace index 16,000.

- Java Development Kit 7 or later[8].
- Android Development Toolkit[7].
- Cloud: backend less.
- ZXing[9].
- REST web service[6].

### B. Operational details

The retailer, who is the admin of the cloud initially updates all the information about the available items to the cloud. When the user registers and logs into the application, the request is sent to the cloud to fetch all the available items. While sending a request to the cloud, initially the request is sent to the servlet of the web server, which in turn requests the inventory to check the available quantity of items.

From inventory, the request is sent to the Item List to get the information of items. The retrieved information from the cloud is sent back to the servlet of the web server. Later, the web server updates all the information received from the cloud to the User Interface. Now, the user can add his/her items of purchase to the cart and can either increase or decrease the quantity of added items and after the user is done with shopping, the order can be confirmed.

Initial login page from where user can access Virtual Cart application is shown in fig. 5a, user can use the application by providing registered username and password. Once the user is logged in to the application, user can access the following set of information (shown in fig. 5b),

- Direction to the nearest shopping mall.
- Start the shopping by fixing the budget
- Scanning and placing the item into virtual cart.
- Recipe list for preparing various dishes.
- Location of the items (floor and rack number in the mall).
- Budget planner.

Budget set page is shown in the snapshot given in the fig. 5c. Cart with the various items is shown in fig. 5d. The final checkout and payment screen is shown in fig. 5e. If the cart value exceed the actual budget of shopping user is given the alert, same is shown in the snapshot 5.

### V. CONCLUSION

As the demand for the mobile shopping is increasing the requirement for the more secure, safe and reliable transaction is of utmost demand. Smartphones, that have become an important part of todays life, have reduced all the efforts that are required for shopping. There are two advantages of it: first no need to stand in the queue for a long time in malls just for scanning the item, second there will be no scope for the frauds that happen in mobile shopping. The transactions that will take place frequently with the shops cloud will be made secure.

### REFERENCES

- [1] E. Constantinides, "Influencing the online consumer's behavior: the web experience," *Internet research*, vol. 14, no. 2, pp. 111–126, 2004.
- [2] G. Nagra and R. Gopal, "An study of factors affecting on online shopping behavior of consumers," *International journal of scientific and research publications*, vol. 3, no. 6, pp. 1–4, 2013.
- [3] D. Gefen, E. Karahanna, and D. W. Straub, "Trust and tam in online shopping: An integrated model," *MIS quarterly*, vol. 27, no. 1, pp. 51–90, 2003.
- [4] Y. Liu, J. Yang, and M. Liu, "Recognition of qr code with mobile phones," in *Control and Decision Conference, 2008. CCDC 2008. Chinese*. IEEE, 2008, pp. 203–206.
- [5] C. Nimodia and H. Deshmukh, "Android operating system," *Software Engineering*, vol. 3, no. 1, p. 10, 2012.
- [6] R. Battle and E. Benson, "Bridging the semantic web and web 2.0 with representational state transfer (rest)," *Web Semantics: Science, Services and Agents on the World Wide Web*, vol. 6, no. 1, pp. 61–69, 2008.
- [7] B. C. Zapata, *Android studio application development*. Packt Publishing Ltd, 2013.
- [8] H. Schildt, *Java 2: the complete reference*. McGraw-Hill Professional, 2000.
- [9] C. Scheuermann, M. Werner, M. Kessel, C. Linnhoff-Popien, and S. A. Verclas, "Evaluation of barcode decoding performance using zxing library," in *Proceedings of the Second Workshop on Smart Mobile Applications, SmartApps*, 2012.